Missouri Department of Natural Resources
*"Integrity and excellence in all we do"*

# MTBE Summary of Facts

Fact sheet 2/2004

## What is MTBE?

MTBE stands for Methyl Tertiary Butyl Ether. It is commonly used as a gasoline additive to reduce engine knocks. MTBE is being tested to see if it causes cancer or other health problems. The U. S. Environmental Protection Agency (EPA) is considering outlawing the use of MTBE as a result of the taste and odor problems in water and unreasonable risk to the environment.

## What is the concern about MTBE?

It's showing up in groundwater all over the country, and it's tough to clean up.

## Why is MTBE still in gasoline?

Gasoline may contain up to 15 percent by volume of MTBE. Higher percentages of MTBE are typically found only in premium grade gasoline. A law effectively banning MTBE in Missouri's gasoline supply was passed in 2002. Because of its wide use and the need for refiners to change their systems, MTBE cannot be eliminated immediately; however, a phase-out of MTBE that protects consumers without affecting gasoline supplies and costs is underway. The phase-out must be concluded by July 1, 2005.

## MTBE and Missouri's water

### How does MTBE get into drinking water?

MTBE may enter the water through gasoline spills, gasoline storage tank leaks, or discharges from two-cycle engines on motorboats and other watercraft. It also enters the atmosphere from airborne emissions from vehicles. MTBE travels through groundwater faster than the other components of gasoline. It does not readily break down.

### How will I know if I have MTBE in my water?

If you get your water from a public water system, it is routinely tested for MTBE and if any were present your water system officials would notify you. MTBE has a very unpleasant taste and a strong turpentine-like odor. If you are on a private well you would be able to smell or taste MTBE contamination long before it would get to a harmful level. EPA has set an advisory level of 20 to 40 parts per billion (ppb) based on the ability of people with a sensitive sense of smell being able to detect it in this range.

### Who watches over my drinking water?

The Missouri Departments of Health and Natural Resources are responsible for protecting the quality of drinking water in Missouri. The Department of Health assists private well owners by offering routine water analyses to all well owners and special analyses on an as-needed basis. The Department of Natural Resources is responsible for making sure that public water supplies are safe. The Department of Natural Resources also regulates well drillers to assure that wells are properly constructed and to protect groundwater quality.

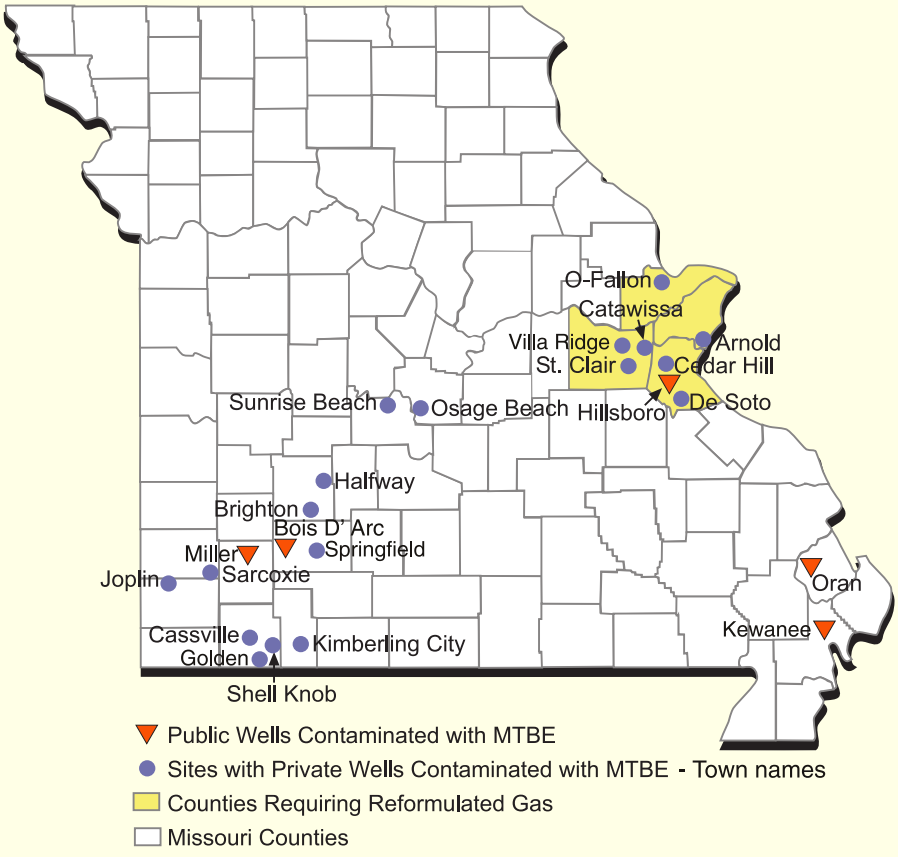
PUB002080

**What should I do if I have a private well and suspect that it is contaminated?**
For routine water sampling, you should first contact your county health department. If you think that your well is contaminated with MTBE, please call the Missouri Department of Health and Senior Services - Section for Environmental Public Health at 1-866-628-9891.

**What if I get water supplied to me?**
The Missouri Department of Natural Resources routinely monitors about 2,000 community public drinking water wells for MTBE and over 100 other potentially harmful compounds at least once every three years. Testing for MTBE began in 1995, so there have been two complete rounds of testing on every public well. The 94 public drinking water systems that use surface water are tested annually for MTBE. Your public water supplier will inform you of any problems.

# Wells Contaminated with MTBE

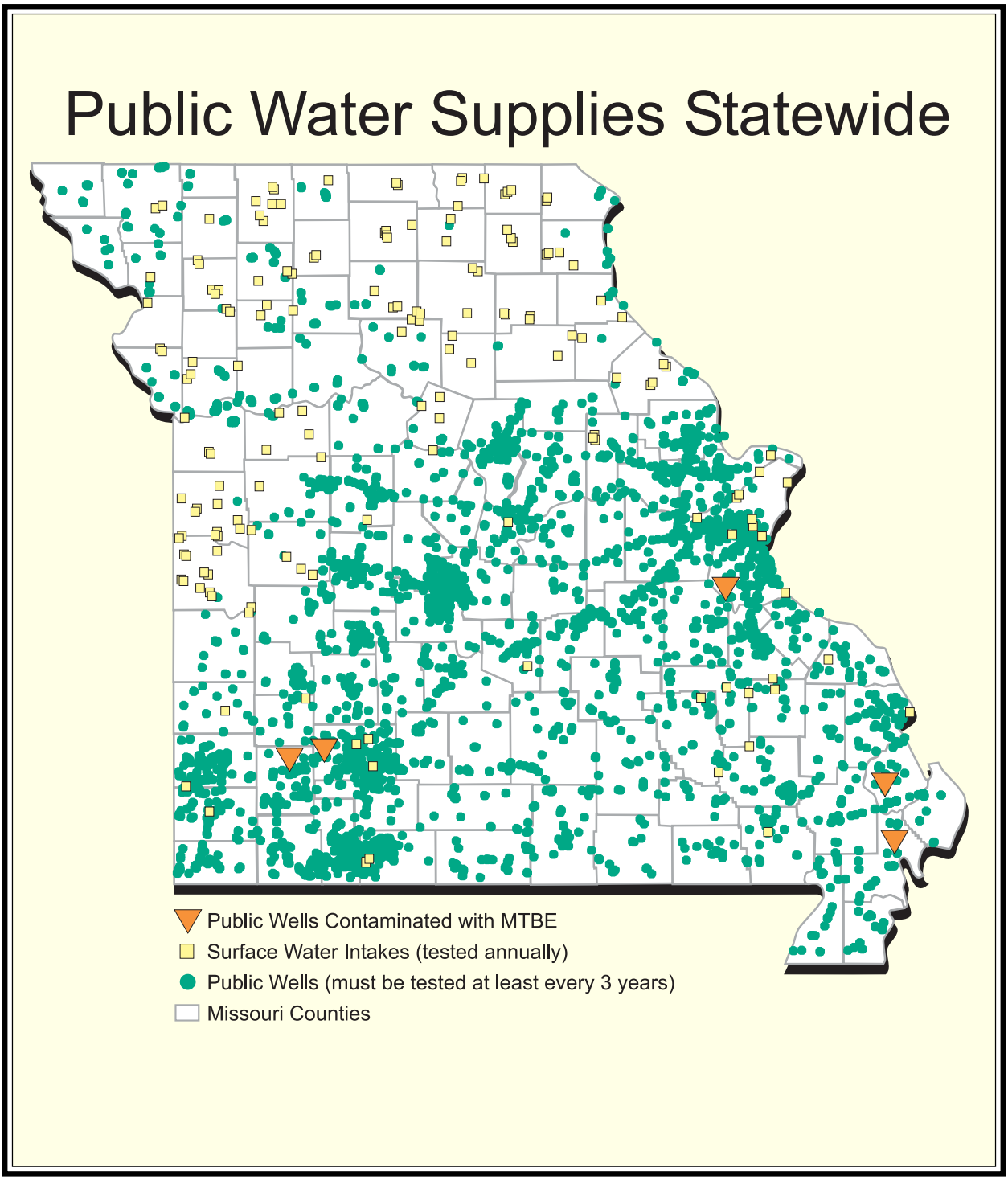
(38 total wells at 23 sites)




Reformulated gasoline is required in the city of St. Louis, Franklin, Jefferson, St. Charles and St. Louis counties. All community and non-transient non-community public water supplies are monitored for MTBE contamination. Six public water supplies have shown trace amounts of MTBE. Twenty-three leaking underground storage tanks sites have contaminated adjacent public or private groundwater wells as of June 2001.

**How big of a problem is MTBE in our water?**
MTBE has been detected in only six public drinking water wells at five different sites in the time that the Missouri Department of Natural Resources has been testing.

MTBE has also been found in 32 private drinking water wells, bringing the total number of wells in Missouri contaminated by MTBE to 38 at a total of 23 different sites as of June 2001.



The table below lists all the contaminated sites, the date when MTBE was first detected, and the highest concentration of MTBE measured. Levels higher than about 20 parts per billion (ppb) can cause the water to have a bad taste and smell.

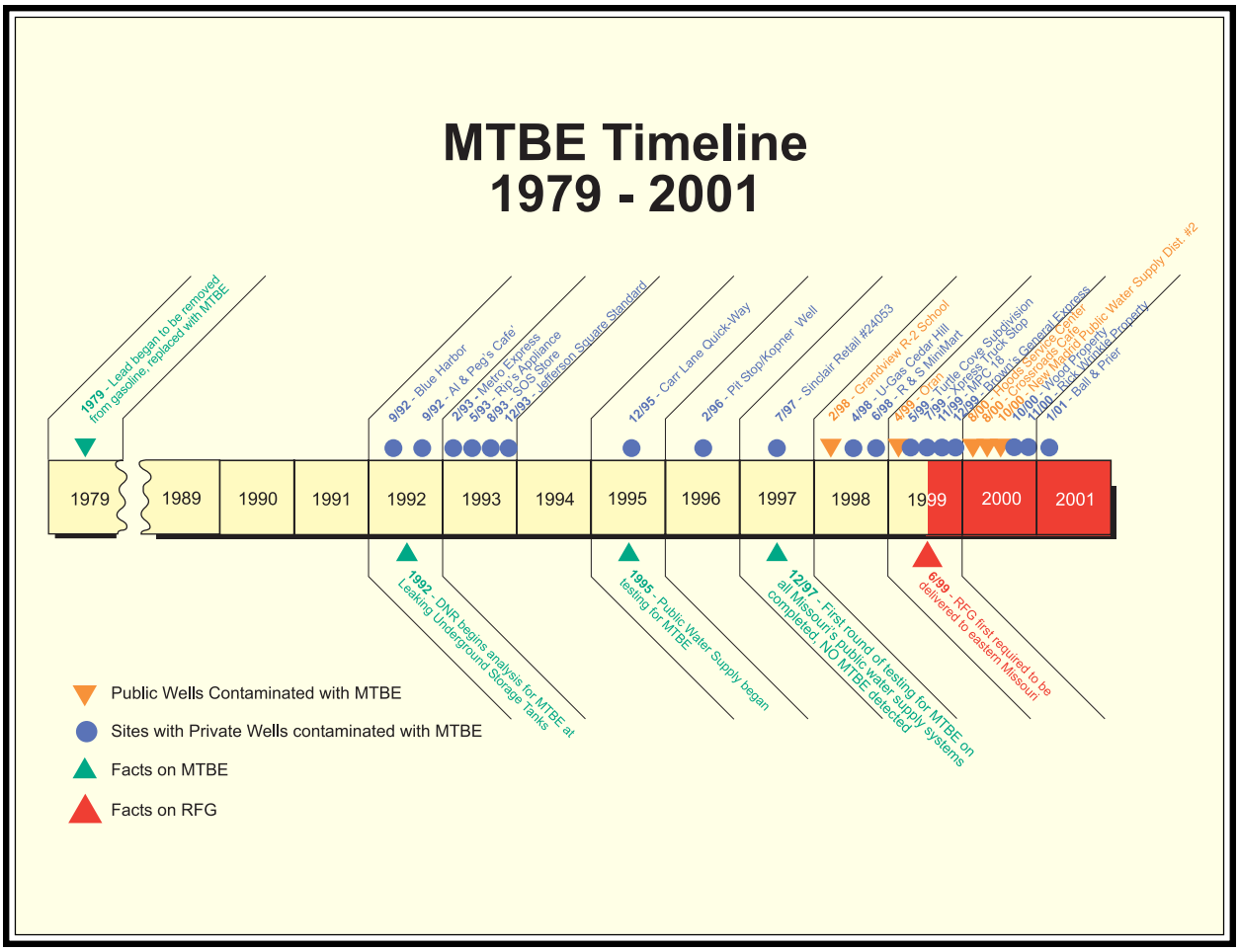
**Currently Active Sites Where MTBE has been Detected in a Public or Private Drinking Water Well**

(The five public sites are shown in shaded cells)

| Name | City | Drinking Water Wells Impacted | Date MTBE first detected | Highest Concentration of MTBE detected (ppb) | How they get their drinking water now |
|---|---|---|---|---|---|
| 1. Hood's Service Center | Bois D'Arc | 1 | 08/01/00 | 363 | Connected to second well; drilling new drinking water well |
| 2. Oran | Oran | 2 | 04/26/99 | 74.7 | New drinking water well |
| 3. Crossroads Cafe | Miller | 1 | 08/23/00 | 11.3 | Cafe' using contaminated well. |
| 4. Grandview R-2 School | Hillsboro | 1 | 02/17/98 | 7.9 | Connected to high school well |
| 5. New Madrid Public Water Supply Dist. #2 | Kewanee | 1 | 10/24/00 | 12.2 | Currently using the well, constructing waterline to hook onto the City of New Madrid. |
| 6. Blue Harbor Marina | Osage Beach | 5 | 09/15/92 | 17,000 | New drinking water wells |
| 7. Ball & Prier | Golden | 1 | 1/19/01 | 16,700 | Bottled water |
| 8. MPC 18 | O'Fallon | 3 | 11/17/99 | 1,870 | Connected to Public Water Supply |
| 9. Sinclair Retail #24053 | St. Clair | 1 | 07/21/97 | 1,640 | New drinking water well |
| 10. Jefferson Square Standard | Desoto | 4 | 12/27/93 | 1,200 | New drinking water wells |
| 11. Rips' Appliance | Sunrise Beach | 2 | 05/04/93 | 500 | Installed new seal in one well, installed new well at other residence |
| 12. Turtle Cove Subdivision | Kimberling City | 1 | 05/10/99 | 330 | New drinking water well |
| 13. U-Gas Cedar Hill | Cedar Hill | 1 | 04/21/98 | 141 | Water treatment system |
| 14. R&S MiniMart | Catawissa | 2 | 06/17/98 | 74.2 | New drinking water wells |
| 15. Al & Peg's Café | Halfway | 1 | 09/24/92 | 27 | Hooked to the city well |
| 16. Metro Express | Joplin | 3 | 02/04/93 | 27 | Connected to neighbor's water supply |
| 17. Pit Stop / Kopner Well | Arnold | 1 | 02/15/96 | 24 | Alternative water source identified |
| 18. SOS Store | Cassville | 1 | 08/26/93 | 18 | Alternative water source identified |
| 19. Brown's General Express | Brighton | 1 | 12/03/99 | 12.2 | Bottled water |
| 20. Carr Lane Quick Way | Shell Knob | 1 | 12/07/95 | 12 | Charcoal filter provided for well |
| 21. Wood Property | Villa Ridge | 2 | 10/19/00 | 8.7 | Filtration added to well |
| 22. Xpress Truck Stop | Sarcoxie | 1 | 7/28/99 | 5.9 | Water treatment system - filtration |
| 23. Wrinkle Property | Springfield | 1 | 11/20/00 | 4.3 | Well currently in use |
| 23 Total sites | 38 wells impacted | | | | |

EPA's Water Quality Advisory for MTBE = 20-40 ppb

Well replacement for some of these sites was financed through the Petroleum Storage Tank Insurance Fund.




## Are these the only places that need to be concerned about MTBE?

No, groundwater moves much more slowly than water in streams, thus many pollution problems aren't found until years after the pollution entered the groundwater. This means that we may find additional sites contaminated with MTBE in the future and it is why the Department of Natural Resources will continue to monitor public wells for MTBE.

## How concerned should I be about MTBE contamination?

Most of Missouri's drinking water supplies come from treated surface water. Wells used for public drinking water supplies in Missouri are constructed to the state's highest standards. These wells are typically deeper than private wells and sealed more effectively to prevent near-surface contaminants from entering our drinking water. Private wells drilled since 1987 are also constructed to a higher standard than older wells. Consumers who are drinking water from older, shallow wells or springs located near gasoline storage or transportation systems are at greatest risk.

## How many gasoline storage tanks are there in Missouri?

There are nearly 10,000 underground storage tanks in use in Missouri at just over 4,000 sites. Nearly 25,000 tanks have been permanently closed in the last two decades. The Department of Natural Resources goal is to inspect each of the tanks in use approximately once every three years.

### What is being done to check on underground tanks?

When a gasoline storage tank leaks, many harmful chemicals can flow into the groundwater. This has led Missouri to require new safety measures and to inspect all tanks. All underground tank operators must monitor their tanks and piping monthly. The records that they keep are reviewed by Department of Natural Resources staff and staff of the Petroleum Storage Tank Insurance Fund. All tanks in use after Dec. 22, 1998, must meet strict design and operating requirements. More than 97 percent of the in-use underground storage tanks have been upgraded in the last 12 years and more than 95 percent of the tanks currently in use have leak detection devices installed.

### What about aboveground tanks?

Aboveground tank owners are required to meet safety and fire requirements. This includes having leak and spill prevention equipment. The Missouri Department of Agriculture inspects aboveground fuel storage and dispensing systems. Some of the aboveground tanks are also insured by the Petroleum Storage Tank Insurance Fund, which also makes sure that the owner has a current spill prevention plan.

### How is MTBE related to Reformulated Gasoline (RFG)?

MTBE was first used in the United States in the late 1970s to enhance octane as the use of lead in gasoline was discontinued. It helps gasoline burn cleaner and reduces engine “knock” and carbon monoxide and air toxics emissions. This is why it is used in reformulated gasoline. MTBE has been used in the St. Louis area as part of the federal reformulated gasoline program since June 1999. Gasoline with ethanol makes up approximately 97 percent of the reformulated gasoline in the St. Louis area, with gasoline containing MTBE comprising the other three percent.

## MTBE and Human Health

### How much MTBE is bad for me?

EPA sets health-based, legally enforceable drinking water standards called Maximum Contaminant Levels (MCLs) for potential drinking water contaminants. MTBE does not currently have an MCL, but it is on EPA’s list of Unregulated Contaminants and is being considered for regulation in the future. In lieu of an MCL, Missouri’s Department of Health has recommended three action levels for MTBE based on the latest risk assessment information. The first action level is a long-term, or lifetime number, which would be equivalent to an MCL and it is 20 ppb. A second action level, which would be protective of shorter-term exposures, is 400 ppb. This action level is designed to set a limit on the amount of exposure that a community public water supply could receive from MTBE while obtaining an alternate water supply. The third action level is an acute one where the water would not be considered safe to drink, even for a short period of time. The acute action level is 1,000 ppb.

It is important to know that MTBE has a strong taste and odor that make it unlikely that you would drink enough MTBE to make yourself seriously ill. EPA’s Human Health and Criteria Division has recommended keeping contamination below the 20 to 40 ppb range to ensure that your water does not have a bad taste and odor. Levels much higher than this advisory range quickly become unacceptable to the public. EPA estimates that concentrations from 20,000 to 100,000 times higher than this are associated with illness or disease in rodent studies.

### How much do we know about MTBE's health effects?

Rats and mice have been given MTBE internally and forced to breathe air rich in MTBE. Some of these animals have gotten sick or developed cancers, apparently as a result of their exposure to high concentrations of MTBE. Few tests have been conducted on humans, and none of these studied the effects of drinking MTBE. Because MTBE is mixed with other harmful chemicals, it has been difficult to study its effects on humans. MTBE is thought to cause cancer based on the animal studies, but only at concentrations far above those likely to be found in humans because of MTBE's offensive taste and smell.

### How much of a risk is gasoline?

A federal government study concluded that other components of gasoline pose much more serious cancer risks than MTBE. Benzene, a component of all gasoline, is known to cause cancer at levels much lower than the likely exposure of anyone to MTBE. In addition, gasoline contains other compounds known to pose health risks at high concentrations.

### If MTBE is bad for humans, why is it still in use?

Much of the information on the health effects of MTBE has only come to light recently. Eliminating MTBE immediately would cause gasoline shortages, higher costs and more air pollution from automobiles. The EPA is considering phasing out MTBE use over the next few years to prevent these possibilities.

### What can I do?

Handle all petroleum products carefully and never pour them on the ground. Make sure that your well is properly constructed and never dump anything on the ground near your well. If you are on a public water system, read the annual Consumer Confidence Report that is made available each year describing the quality of your water. If your water smells or tastes of turpentine or has some other unusual smell or taste, contact your local water supplier. For private well owners, please call the Missouri Department of Health and Senior Services at 1-866-628-9891.

## Where can I get more information?

For more information on MTBE call or write
Missouri Department of Natural Resources
Environmental Assistance Office
Outreach and Assistance Center
P.O. Box 176, Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 526-6627 office
(573) 526-5808 fax
www.dnr.mo.gov/oac/env_assistance.htm Program Home Page

### What programs deal with drinking water quality in Missouri?

**MoDNR – Public Drinking Water Program**
www.dnr.mo.gov/wpscd/pdwp
Helps ensure the safety of public drinking water by monitoring for as many as 90 chemicals and bacteria that can cause illness.

**MoDNR – Environmental Services Program**
www.dnr.mo.gov/alpd/esp
Conducts field sampling and laboratory tests on Missouri's water and air. Responds to emergencies involving hazardous chemicals.

**MoDNR – Hazardous Waste - Underground Storage Tanks Section**
www.dnr.mo.gov/alpd/hwp/tanks.htm
Helps prevent contamination caused by corrosion, leaks, overfilling and spills from underground storage tanks.

**MoDNR – Wellhead Protection Section**
www.dnr.mo.gov/geology/geosrv/wellhead.htm
Protects the groundwater from contamination by ensuring that all private wells are built to state standards.

**Missouri Department of Health and Senior Services – Section for Environmental Public Health** – E-mail them at maleyr1@dhss.mo.gov.

**Missouri Department of Agriculture – Petroleum Quality and Inspection Program**
www.mda.state.mo.us/FuelQuality/e1a.htm
Assures that all motor fuels and other fuels meet minimum quality specifications.

**Petroleum Storage Tank Insurance Fund**
www.pstif.org
Provides pollution liability insurance to owners and operators of underground and aboveground tanks and pays to clean up old tank sites.

## Hotlinks to other information on MTBE

| Site Name | Web address |
|---|---|
| EPA News Release - Eliminate MTBE | http://yosemite.epa.gov/opa/admpress.nsf/34cef4854b892b8b8525645a004de9a4/2054b28bf155afaa852568a80066c805?OpenDocument |
| EPA Office of Underground Storage Tanks | www.epa.gov/swerust1/mtbe |
| EPA Office of Mobile Sources | www.epa.gov/omswww/consumer/fuels/mtbe/mtbe.htm |
| EPA Office of Groundwater and Drinking Water | www.epa.gov/ogwdw/mtbe.html |
| EPA Office of Research and Development | www.epa.gov/ncea/oxyneeds.htm |
| EPA Blue Ribbon Panel (Clean Air Act Advisory Committee Panel on Oxygenate Use in Gasoline) | www.epa.gov/oms/consumer/fuels/oxypanel/blueribb.htm |
| EPA Integrated Risk Information System | www.epa.gov/iris/subst/0545.htm |
| U.S. Geological Survey (USGS) | ca.water.usgs.gov/mtbe<br>wwwsd.cr.usgs.gov/nawqa/pubs<br>wwwsd.cr.usgs.gov/nawqa/vocns/mtbe/bib |
| California Air Resources Board | www.arb.ca.gov/cbg/pub/pub.htm |
| California Department of Health Services | www.dhs.cahwnet.gov/org/ps/ddwem/chemicals/mtbe/mtbeindex.htm |
| Lawrence Livermore National Laboratory (Note: Adobe Acrobat Reader needed to view this page) | www-erd.llnl.gov/mtbe/pdf/mtbe.pdf |
| University of California at Davis | tsrtp.ucdavis.edu/mtbe<br>tsrtp.ucdavis.edu/mtberpt |
| National Water Research Institute | www.ocwd.com/nwri/mtbe.htm |
| The Oxygenated Fuels Association | www.ofa.net |
| American Petroleum Institute | www.api.org/ehs/mtbelink.htm |
| DOE's Energy Information Administration | www.eid.doe.gov |
| National Academy of Sciences | www.nas.edu |
| National Academy Press | www.nap.edu |
| Petroleum Storage Tank Insurance Fund | www.pstif.org |